

(19) World Intellectual Property
Organization
International Bureau



(43) International Publication Date
31 March 2005 (31.03.2005)

PCT

(10) International Publication Number
WO 2005/029846 A1

(51) International Patent Classification⁷: **H04N 5/21, 7/26**

(21) International Application Number:
PCT/IB2004/051813

(22) International Filing Date:
21 September 2004 (21.09.2004)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
60/505,232 23 September 2003 (23.09.2003) US

(71) Applicant (for all designated States except US): **KONINKLIJKE PHILIPS ELECTRONICS, N.V.** [NL/NL]; Groenewoudseweg 1, NL-5621 BA Eindhoven (NL).

(72) Inventor; and

(75) Inventor/Applicant (for US only): **YE, Jong Chul** [KR/US]; P.O. Box 3001, Briarcliff Manor, New York 10510-8001 (US).

(74) Common Representative: **KONINKLIJKE PHILIPS ELECTRONICS, N.V.**; c/o Gathman, Laurie P.O. Box 3001, Briarcliff Manor, New York 10510-8001 (US).

(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

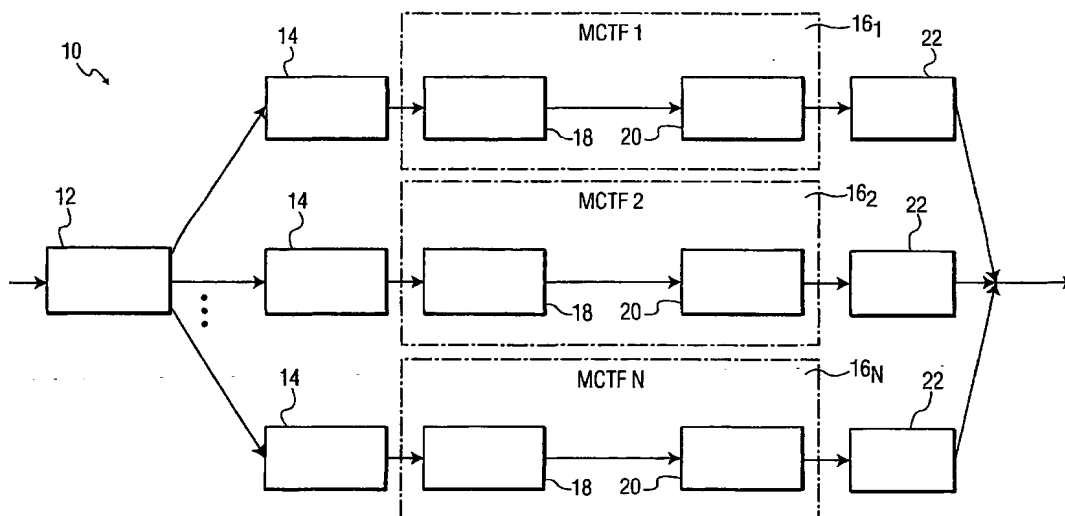
(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Declarations under Rule 4.17:

- as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii)) for the following designation US
- as to the applicant's entitlement to claim the priority of the earlier application (Rule 4.17(iii)) for all designations

[Continued on next page]

(54) Title: VIDEO DE -NOISING ALGORITHM USING INBAND MOTION-COMPENSATED TEMPORAL FILTERING



(57) Abstract: Method for de-noising video signals in which a wavelet transformer (12) spatially transforms each frame of a video sequence into two-dimensional bands which are subsequently decomposed in a temporal direction to form spatial-temporal sub-bands. The spatial transformation may involve the application of a low band shifting method to generate shift-invariant motion reference frames. The decomposition of the two-dimensional band, may involve the use of motion-compensated temporal filters (16), one for each two-dimensional band. Additive noise is then eliminated from each spatial-temporal sub-band, for example, using a wavelet de-noising technique such as soft-thresholding, hard-thresholding and a wavelet wiener filter.



Published:

— with international search report

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.